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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
PRATS, FRANCISCO CHANDLER	
ART UNIT	PAPER NUMBER
1651	

DATE MAILED: 07/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	08/716,344	ENGSTAD ET AL.	
	Examiner	Art Unit	
	Francisco C Prats	1651	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 May 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,7-10,13 and 16-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 2, 7-10, 13 and 16-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

The amendment filed May 14, 2004, has been received and entered. The text of those sections of Title 35, U.S. Code, not included in this action can be found in a prior office action.

Claims 1, 2, 7-10, 13 and 16-23 are pending and are examined on the merits.

Note that because applicant did not present claim 12 in the listing of claims to be examined, claim 12 is therefore not considered to be pending for examination.

Claim Rejections - 35 USC § 112

Claims 1, 2, 7-10, 13 and 16-23 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

At the outset it is noted that applicant failed to use bracketing and underlining to indicate the deletion of the comma and insertion of the word "and" as required by 37 CFR 1.121. While seemingly innocuous, this undocumented change actually changes the product recited in claims 1, 7, 8, 9, 13 and 16 to

the same product recited in claim 20. Thus, the new matter rejection applied to claims 20 and 21 in the previous office action now applies to all of the claims.

Specifically, the previous set of claims made it appear as if the claim-designated glucan product was essentially free of β-1,6-linked side chains having four or less β-1,6-bound glucose units. By replacing the comma in the last line of claims 1, 7, 8, 9, 13 and 16 with the word "and," the claims recite yet another different product. Instead of a glucan product free of β-1,6-linked side chains having four or less β-1,6-bound glucose units, the claims now recite a product which is free of β-1,6-linked side chains, yet may contain four or less β-1,6-bound glucose units. The as-filed specification does not provide support for a β-1,3 glucan which is free of β-1,6-linked side chains, yet may contain four or less β-1,6-bound glucose units.

As discussed in the previous office action, page 4, lines 9-16, of the specification describe a molecule wherein either most or essentially all of the short β-1,6-linked branches of 4 glucose units or fewer have been removed. That is, depending on what "essentially" means, the described product will basically have no side chains of 4 or fewer glucose units. However, the molecule described in the specification has no limit as to the number of β-1,6-linked branches of more than 4 glucose units.

Thus, the new limitation in claim 20 requiring "four or less β-1,6-bound glucose units" lacks support in the specification as filed. A holding of new matter is therefore required.

Note that this ground of rejection can be overcome by amending the claims to recite that the glucan product is -- essentially free of β-1,6-linked chains containing more than four β-1,6-bound glucose units --. It is respectfully submitted that such a product is what is described in the specification.

Claim Rejections - 35 USC § 112

Claim 8 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 8 is indefinite because it does not state which claim it depends from.

Note that the rejection over the language "essentially free" has been with drawn in view of applicant's argument. While the phrase's meaning is broad in the context of this application, encompassing meanings ranging from "more than half" to "almost all", the skilled artisan would be able to ascertain the meaning of the phrase when viewing the as-filed specification.

Claim Rejections - 35 USC § 102

Claims 1, 7-10, 13, 16-19, 22 and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Shiota et al (J. Biochem. 98:1301-1307 (1985)).

Shiota et al disclose a process wherein the claim-designated polysaccharide, *Saccharomyces cerevisiae* β-glucan, is hydrolyzed with the claim-designated enzyme. *See* p. 1303. ("Enzymatic hydrolysis of the skeletal glucan was performed with . . . *Neurospora crassa* endo-(β-1-6)-glucanase. The sample (about 100 mg) was incubated with . . . the endo-(β-1-6)-glucanase (2.8 U) in 2 ml of sodium acetate buffer (0.01 M, pH 5.0) at 35 C for 24 h.").

The claims have been amended to require the glucan to be in insoluble particulate form, and that the glucans are essentially free of β-1,6-linked chains of 4 or less glucose chains. The limitation requiring insoluble particles is considered to be met by Shiota based on the fact that the glucan prepared by Shiota is the insoluble fraction obtained by alkali and acid extraction. See page 1302, right hand column, paragraph entitled "*Preparation of Cell Wall Skeletal Glucan.*" Note specifically that this is a virtually identical process by which

the glucan starting material is prepared in Example 1 of applicant's specification.

Similarly, Shiota meets the limitation requiring the glucans to be essentially free of β-1,6-linked chains of 4 or less glucose chains because Shiota contacts the identical material as claimed with an enzyme having an identical catalytic activity. By subjecting the same material as claimed to the same conditions, the result must necessarily be the same. The laws of chemistry require it. Similarly, because the same starting material as disclosed by applicant is subjected to the same enzymatic treatment, the resulting product must have the same properties, including those recited in new claims 22 and 23. Thus Shiota anticipates the claimed processes and products.

All of applicant's argument regarding this ground of rejection has been fully considered but is not persuasive of error. Applicant again argues that the glucanase used by Shiota is from a different microorganism than the claimed glucanase. However, it is again respectfully pointed out that none of the claims in this ground of rejection recite anything about the source microorganism for the enzyme. Thus, applicant is arguing about a limitation not present in the claims.

The claims subject to this ground of rejection require only the action of a β-1,6-glucanase, without specifying the source

organism. Shiota uses a β-1,6-glucanase. Shiota therefore meets the claim limitation. The only pending claim requiring a specific source organism for the enzyme is claim 2. Claim 2 is not included in this ground of rejection.

As pointed out in the previous office action, applicant's assertion that the claimed glucan product is different from Shiota's glucan product is not based on any fact in evidence. Rather, applicant states that the products are different, without offering any evidentiary support whatsoever for that statement. Shiota contacts a starting material identical to the claimed starting material with an enzyme having a catalytic activity identical to the claimed enzyme. The inevitable result is that the resulting product will be the same.

Moreover, to the extent that applicant urges that Shiota's product is not essentially free of β-1,6-linked chains of 4 or less glucose units, applicant provides no direct evidence in support of this assertion. Further still, in view of the fact that the specification requires removal of only "most" of the undesired side chains to have a glucan "essentially free" of undesired side chains, applicant's argument ignores the relatively broad scope of the claims. In sum, because applicant has failed to provide any evidence that the products are different, the rejection must be maintained.

Claims 1, 2, 7-10, 13, 16-19, 22 and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Yamamoto et al (Agr. Biol. Chem. 38(8):1493-1500 (1974)).

Yamamoto discloses a process wherein yeast glucan (the claimed starting material) is contacted with an endo-β-1,6-glucanase (the claimed enzyme) from *Rhizopus chinensis* (one of the claimed microorganism sources for the enzyme). See, e.g., page 1497, Table IV; see also Fig 11. Note specifically that the hydrolysis was performed for 45 hours, until an apparent steady state was reached. Therefore, the reference is properly considered to describe removal of essentially all β-1,6-linked side chains. Also, because the same starting material as disclosed by applicant is subjected to the same enzymatic treatment, the resulting product must have the same properties, including those recited in new claims 22 and 23. A holding of anticipation over the cited claims is required.

All of applicant's argument regarding this ground of rejection has been fully considered but is not persuasive of error. Applicant argues that the glucanase used by Yamamoto is from a different microorganism than the claimed glucanase. However, claim 2 recites that the enzyme can be obtained from "*Rhizopus chinensis*" and Yamamoto discloses that the enzyme used

to digest the yeast glucan was obtained from "*Rhizopus chinensis*". See title. The rejection must therefore be maintained.

Claims 20 and 21 are rejected under 35 U.S.C. 102(e) as being anticipated by Rorstad et al (U.S. Pat. 5,401,727).

Rorstad discloses the immunostimulation of fish by intraperitoneal injection of glucans. See, e.g., columns 7 and 8. It is noted that, unlike claims 20 and 21, the preferred glucan for immunostimulation in Rorstad is a highly branched product called M-glucan. See, e.g., column 5, lines 1-11. However, Rorstad broadly discloses that the glucans described therein include unbranched glucans (column 4, lines 48-52), as well as molecules having "at least one branch of glucopyranose units linked by beta-1,6 bonds" (column 4, lines 55-56). Thus, glucans suitable for use in Rorstad's immunostimulation process can be unbranched or contain as few as one β-1,6-linked side chain. Rorstad's immunostimulatory glucans can therefore be considered to be "essentially free" of such side chains. Therefore, despite the fact that Rorstad describes a different glucan than recited in claims 20 and 21 as being the preferred glucan for immunostimulation in fish, a holding of anticipation is clearly required. See MPEP § 2123.

All of applicant's argument regarding this ground of rejection has been fully considered but is not persuasive of error. While it may be applicant's intent to improve on the process of Rorstad, the fact remains that Rorstad discloses that a glucan falling within the description of the claimed product is useful in the immunostimulation of fish in aquaculture.

Claim Rejections - 35 USC § 103

Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shiota et al (J. Biochem. 98:1301-1307 (1985)) or Yamamoto et al (Agr. Biol. Chem. 38(8):1493-1500 (1974)) in view of de la Cruz et al (Arch. Microbiol. 159:316-322 (1993)).

Claim 2 limit the β-1,6-glucanase of claim 1 to an enzyme obtained from *Trichoderma harzianum*. As discussed immediately above, both Shiota and Yamamoto anticipate claim 1. However, the β-1,6-glucanase used by Shiota and Yamamoto is from a different microorganism than the β-1,6-glucanase recited in claim 2. Despite this difference, the artisan of ordinary skill at the time of applicant's invention would have recognized and reasonably expected that any β-1,6-glucanase, including the β-1,6-glucanase disclosed by de la Cruz, could have been used equivalently to the β-1,6-glucanase used in the Shiota process. Thus, because the process recited in claim 2 differs from Shiota

only in the use of a known equivalent β-1,6-glucanase enzyme, the process recited in claims 2 and 3 would have been obvious at the time of applicant's invention.

All of applicant's argument regarding this ground of rejection has been fully considered but is not persuasive of error. Applicant urges that the Shiota reference does not disclose the immunostimulatory or immunomodulatory properties of the glucans produced by the claimed hydrolysis. However, those properties must be inherent in the products made by Shiota's process, because the same starting material as claimed, yeast glucan, is contacted with an enzyme having the same catalytic activity as claimed, endo-β-1,6-glucanase activity. Thus, if there is a difference between Shiota's product and the claimed product, it is due to some unclaimed aspect of the invention.

The fact that neither Shiota nor Yamamoto discloses the use of a *Trichoderma harzanium* glucanase has been recognized. However, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Thus, because one of ordinary skill would have considered enzymes having endo-β-1,6-glucanase activity to be interchangeably equivalent, regardless of source microorganism,

the artisan of ordinary skill would have considered obvious the claimed substitution of de la Cruz's enzyme for Shiota's enzyme. That is, in view of Shiota's disclosure of the requirement for endo-β-1,6-glucanase activity, the artisan of ordinary skill would have considered the use of such an enzyme obvious, regardless of source microorganism. While applicant suggests that the immunostimulatory or immunomodulatory properties of the glucans produced by the claimed hydrolysis are an unexpected result, applicant provides no evidence, such as a comparison to the closest prior art (e.g., Shiota or Yamamoto) for this suggestion. The rejection must therefore be maintained.

No claims are allowed.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened

statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Francisco C Prats whose telephone number is 571-272-0921. The examiner can normally be reached on Monday through Friday, with alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael G Wityshyn can be reached on 571-272-0926. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Francisco C Prats
Primary Examiner
Art Unit 1651

FCP